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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,820	03/11/2004	Tetsuo Shibamura	09792909-5843	7109

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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/798,820	Applicant(s) SHIBANUMA ET AL.	
	Examiner Marie R. Yamnitzky	Art Unit 1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2004 and 03 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/704,968.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>rec'd 11 Mar 2004</u> | 6) <input type="checkbox"/> Other: _____ |

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1. The preliminary amendment filed March 11, 2004, which amends the specification, cancels claims 1-10, and adds claims 11-42, has been entered.

Claims 11-42 are pending.

2. The disclosure is objected to because of the following informalities:

The first paragraph on page 15 discloses "a furfuryl group" as a specific example of a hydrocarbon group for R^1 and R^2 . A furfuryl group is not a hydrocarbon group.

Appropriate correction is required.

3. Claims 11-42 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The application, as originally filed, does not provide full support for the n-methyl-, n,n-dimethyl-, n,n,n-trimethyl-, n-ethyl-, n,n-diethyl- and n,n,n-triethylcyclohexyl groups named in the eighth-tenth lines after formula (I) in claim 11, or for the n,n-dimethyl-, n,n,n-trimethyl-, n-ethyl-, n,n-diethyl- or n,n,n-triethylphenyl groups named in the fifth-sixth lines after formula (III) in claim 29. Specifically, the application does not provide support for the "n", "n,n" and "n,n,n" designations in these names.

Support for an n-propylcyclohexyl group, an n,n-dipropylcyclohexyl group, an n,n,n-tripropylcyclohexyl group, an n-cyclohexylcyclohexyl group, an n-phenylcyclohexyl group or an

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n-tert-octylcyclohexyl group, as recited in the eleventh-thirteenth line after formula (I) in claim 11, is not clear. The examiner does not find these groups explicitly named as possibilities for R^1 and R^2 in the original disclosure, or shown in the formulae on pages 17-52 of the specification.

The application, as originally filed, does not provide support for the subgenus of compounds of formula (II) as defined in independent claim 17. For example, as defined in claim 17, R^4 and R^5 may both be hydrogen, but this provides compounds of formula (I) in which each of R^1 and R^2 is a methyl group, which is outside the scope of the original disclosure. Formula (II) as defined in claim 17 also provides compounds which, while within the generic scope of compounds of originally defined formulae (I) and/or (III), are not explicitly disclosed in the original disclosure.

Support for the negative limitation “but do not form an interlocking macrocyclic compound”, as recited in independent claims 23 and 29, is not clear. The examiner does not find this negative limitation recited in the original disclosure.

Support for an n-isopropylphenyl group, as recited in the penultimate line of claim 23, is not clear.

Support for an n-tert-butylphenyl group, as recited in the last two lines of claim 29, is not clear.

4. Claims 11, 17, 23, 29 and 35-42 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Claims which fail to recited features that are critical

or essential to the practice of the invention are not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

In the present case, a pair of electrodes is a critical/essential feature of an electroluminescent device.

While one could possibly read the limitation of a pair of electrodes into independent claims 11, 17, 23 and 29 by the preamble recitation of "electroluminescent device", it is apparent from the language of dependent claims 12, 18, 24 and 30 that the device of claims 11, 17, 23 and 29, with claims 35-42 dependent therefrom, is not required to comprise a pair of electrodes.

5. Claims 11-16, 23-36 and 39-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claim 11 contains a broad definition for R^1 and R^2 followed by a definition that is narrower in most respects ("selected from the group consisting of..."). The broad definition requires each of R^1 and R^2 to be a hydrocarbon group provided that at least one of R^1 and R^2 has at least two carbons whereas all the members of the Markush group are hydrocarbons having two or more carbons, with the exception of the recited "furfuryl group" which is not a hydrocarbon group. It is not clear if R^1 and R^2 are limited to the broad definition, or to the Markush group.

The eighth-tenth lines following formula (I) in claim 11 name n-methyl-, n,n-dimethyl-, n,n,n-trimethyl-, n-ethyl-, n,n-diethyl- and n,n,n-triethylcyclohexyl groups. The use of "n", "n,n"

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and “n,n,n” in these instances is confusing because the n’s do not indicate the position of a methyl or ethyl substituent on the cyclohexyl group, and methyl and ethyl do not have different isomeric forms that would necessitate the use of “n” to distinguish normal from “iso” or “tert” forms.

Likewise the use of “n” in the three instances in the twelfth line following formula (I) in claim 11 is confusing. In the case of “n-tert-octylcyclohexyl”, an octyl group may have an “n” form, or may have a “tert” form, but cannot have both “n” and “tert” forms as implied by the name.

The recitation of “a furfuryl group” as a member of a Markush group from which R¹ and R² is selected is confusing if R¹ and R² must be hydrocarbon groups. A furfuryl group is not a hydrocarbon group.

The use of “n” in “n-isopropylphenyl group”, as recited in the penultimate line of claim 23, is confusing. A propyl group may have an “n” form, or may have an “iso” form, but cannot have both “n” and “iso” forms as implied by the name.

The use of “n” in “n-tert-butylphenyl group”, as recited in the last two lines of claim 29, is confusing. A butyl group may have an “n” form, or may have a “tert” form, but cannot have both “n” and “tert” forms as implied by the name.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 17-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Forrest et al. (WO 99/53724).

Forrest et al. anticipate an electroluminescent device as claimed in present claims 17-22 wherein the hole-blocking layer comprises a compound of formula (II) wherein each of R⁴ and R⁵ is hydrogen. In particular, see Fig. 11 B, page 24, lines 10-14, and p. 39, l. 4-p. 40, l. 6 (note that at p. 40, l. 5, "DCP" should apparently read --BCP--).

8. Claims 17-19 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakada et al. (EP 0 564 224 A2).

Nakada's device of Example 2 anticipates a device as claimed in present claims 17-19 and 21.

The compound of formula (40) as shown on page 14, which is utilized in an electron transport layer in the electroluminescent device of Example 2 (p. 27), is a compound of formula (II) wherein each of R⁴ and R⁵ is hydrogen.

Although Nakada et al. describe the layer made of compound (40) as an electron transport layer rather than a hole-blocking layer, the electron transport layer made of compound (40) will also inherently function as a hole-blocking layer.

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9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al. (WO 99/53724) as applied to claims 17-22 above, and for the further reasons set forth below.

Forrest et al. do not disclose the brightness of the device depicted in Fig. 11B. The brightness of a device is an optimizable feature, affected by various factors including the composition of the different layers used to make the device. Note, for example, the first two lines following the headings in Table 2 on page 31. A device comprising a layer of Alq₃:10% DCM2 had a brightness of 1400 cd/m² whereas a device comprising a layer of Alq₃:1% DCM2 had a brightness of 15200 cd/m².

It would have been within the level of ordinary skill of a worker in the art at the time of the invention to optimize device structure and composition so as to obtain suitable and optimum device characteristics such as brightness. One of ordinary skill in the art would have been motivated to optimize device characteristics such as brightness so as to increase the usefulness of the device.

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11. Claims 11-13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada (EP 0 564 224 A2).

Nakada's device of Example 2 is similar to a device as claimed in present claims 11-13 and 15.

The compound of formula (40) as shown on page 14, which is utilized in an electron transport layer in the electroluminescent device of Example 2 (p. 27), is a homolog of a compound of formula (I) wherein one or both of R^1 and R^2 is a hydrocarbon group (specifically, an alkyl group) having at least two carbons. Nakada's compound (40) is a compound of formula (I) wherein each of R^1 and R^2 is an alkyl group having one carbon. Nakada et al. suggest that any alkyl group may be used as a substituent on the phenanthroline ring structure (e.g. see p. 2, l. 23-40). It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds similar to the specific compounds disclosed by Nakada et al. with the expectation that similar compounds would have similar properties and could be used for the same purpose. One of ordinary skill in the art at the time of the invention would have reasonably expected that compounds having an alkyl group of two or more carbons, such as an ethyl group or propyl group, in place of one or both of the methyl groups in Nakada's compound (40) would have similar properties to compound (40) and could be used for the same purpose. Compounds which are homologs are generally of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties.

Although Nakada et al. describe the layer made of compound (40) as an electron transport layer rather than a hole-blocking layer, an electron transport layer made of compound

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(40) or compounds similar to compound (40) will also inherently function as a hole-blocking layer.

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

13. Claims 11-42 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent No. 6,524,728 B1.

Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims are drawn to an electroluminescent device comprising a hole-blocking layer comprising a bathophenanthroline derivative. There is substantial overlap between the bathophenanthroline derivative as defined in the patented claims and the bathophenanthroline derivatives represented by formulae (I), (II) and (III) as defined in the present claims. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to provide various alkyl substituted bathophenanthroline compounds and

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various aryl substituted bathophenanthroline compounds for use in a hole-blocking layer of an electroluminescent device as in the patented claims. There is no evidence of record to demonstrate that the specific alkyl substituents and aryl substituents named in the present claims provide superior/unexpected results.

Regarding the brightness limitation required by present claims 35-42, the patented claims do not limit the brightness of the claimed device. The brightness of a device is an optimizable feature, affected by various factors including the composition of the different layers used to make the device. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to optimize device structure and composition so as to obtain suitable and optimum device characteristics such as brightness. One of ordinary skill in the art would have been motivated to optimize device characteristics such as brightness so as to increase the usefulness of the device.

14. Miscellaneous:

In the thirteenth line after formula (I) in claim 11, "2-ethylhexyl" should read --2-ethylhexyl--.

In the third line after formula (III) in claim 23, the comma after "a" should be deleted.

The sixth line after formula (III) in claim 23 includes three chemical names, each ending in "oryl". In each case, "oryl" should apparently read --olyl-- to indicate the monovalent form of benzoxazole, benzothiazole and benzoimidazole groups (emphasis added).

Clarification regarding the title of the present application is required. Some of the papers filed with the present application, such as the application transmittal letter and cover sheet for the specification, give the title as "Optical Recording Medium". The application was pre-grant published with this title. However, the executed declaration gives the title as "BATHOPHENATHROLINE COMPOUND AND PROCESS FOR PREPARING THE SAME". Page 1 of the specification gives the title as "BATHOPHENANTHROLINE COMPOUND AND PROCESS FOR PREPARING THE SAME". (Note the difference in spelling of the first word in the declaration and page 1 of the specification.)

15. The Information Disclosure Statement filed March 11, 2004 indicates that the cited references were considered during prosecution of parent Application No. 09/704,968. The examiner has reviewed the parent application and notes that the last two non-patent literature documents listed on the present form (Littman et al. and Kijima et al.) were not cited/made of record during prosecution of the parent application. Since no copies of these two references have been provided, the references have not been considered.

16. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
October 26, 2005



MARIE YAMNITZKY
PRIMARY EXAMINER

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